

REMARKS**I. General**

Claims 1-37 are pending. Claims 1-4 and 8-33 are finally rejected. Claims 5-7 are objected to and claims 34-37 are allowed. The issues raised in the Office Action mailed September 30, 2003 are:

- Claims 1-4 and 8-33 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Applicants' admitted prior art in view of US Patent Number 4,696,055 to Marshall (hereinafter *Marshall*) and further in view of US Patent Number 6,400,416 to Tomasz (hereinafter *Tomasz*); and
- Claims 5-7 are objected to as being dependent upon a rejected base claim, but would be allowed if rewritten in independent form including all of the limitations of the base claim and any intervening claims; and
- Claims 34-37 are allowed.

Applicants respectfully submit that the arguments presented in the Amendment filed July 1, 2003 are believed to be applicable to the rejections of record and, therefore, are incorporated herein by reference. Thus, Applicants respectfully request the Examiner to consider the arguments presented in the Amendment filed July 1, 2003 with the arguments presented herein.

II. Summary of Examiner Interview

A telephone interview was conducted between PTO Examiner Pablo N. Tran and Applicants' attorneys (Ross Viguet and Andrew Vicknair) regarding the pending application on December 15, 2003. Applicants' attorney thanks Mr. Tran for taking the time to review and discuss the pending application. Specifically, the parties discussed the motivation for combining Applicant's admitted prior art and *Marshall*. No agreement was reached regarding this issue. In addition, the parties discussed the argument that *Marshall* does not teach a single sideband mixer. No agreement was reached concerning this issue. The parties also discussed elements present in several dependent claims that were not specifically addressed by the Examiner in the final rejection. The dependent claims containing elements not specifically addressed include claims 11-14, 17, 18, 22, 24, 25, 27-29, and 31-33. The Examiner agreed to take a closer look at these dependent claims in determining the presence

of patentable subject matter and further agreed to reconsider the Applicants' lack of motivation arguments.

III. Rejection under § 103(a)—Combination of Applicants' admitted prior art, *Marshall*, and *Tomasz*

Claims 1-4 and 8-33 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Applicants' admitted prior art in view of *Marshall* and further in view of *Tomasz*. Applicants respectfully traverse the rejection and assert that the rejected claims are allowable at least for the reasons stated below.

To establish a prima facie case of obviousness under 35 U.S.C. § 103(a), there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. In addition, the prior art cited must teach or suggest all the claim limitations. See MPEP §2143. Applicants respectfully assert that the rejection does not satisfy these two requirements, and therefore, the claims are patentable under 35 U.S.C. § 103(a). Applicants' arguments previously presented in the Amendment filed July 1, 2003 still stand and for the sake of brevity will not be repeated herein.

A. No Suggestion or Motivation to Combine

1. No Suggestion to Combine Applicants' Admitted Prior Art and *Marshall*

The Examiner concedes that the primary reference, the Applicants' admitted prior art, does not specifically disclose the existence of single sideband mixers. (See Final Office Action, page 4). In an effort to overcome this deficiency, the Examiner relies on *Marshall* as teaching that single sideband mixers are well known in the art. However, proper motivation is required for an obviousness rejection under 35 U.S.C. §103.

It is well settled that the prior art must suggest the desirability of the claimed invention. MPEP §2143.01. Neither the Applicants' admitted prior art nor *Marshall* detail any desirability to combine the teachings in order to provide single sideband mixer circuits as set forth by the claims. The Examiner asserts that it would have been obvious to provide a pair of single sideband mixers in place of the first and second mixers of Applicants' admitted prior art to provide for a lower inherent noise output and to remove unwanted image signals.

(See Final Office Action at 4). Applicants submit that one of ordinary skill in the art would not have been motivated to make the Examiner's proffered modification to the applied art to replace the mixers of Applicants' admitted prior art with the tunable filter (14) taught by *Marshall*. As discussed in the present specification at page 9, lines 13-16, filters 141 and 142 of the Applicants' admitted prior art provide very sharp pass band cutoffs in order to sufficiently filter the spurious signals associated with mixing a high intermediate frequency (HIF) with a carrier provided by the local oscillator LO 132. (Specification at page 9, lns 13-16). Accordingly, filter 141 is able to filter the images and other undesired spurious signals resulting from mixing the input with the carrier signal provided by LO 131. (Specification, page 8, lns 20-23). In addition, filter 142 provides filtering sufficient to supplement that provided by filter 141 and redress any additional spurious signals as well as the spurious signals associated with mixer 122. (Specification, page 10, lns 14-17).

Assuming, arguendo, that the tunable filter of *Marshall* is a single sideband mixer, one of ordinary skill in the art would not have been motivated to increase the complexity of the circuit disclosed in the Applicants' admitted prior art (circuit in Figure 1) by replacing mixers 121 and 122 with the tunable filter of *Marshall* (asserted to provide a single sideband mixer by the Examiner). By replacing mixers 121 and 122 with a single sideband mixer, one would be increasing the complexity of Applicants' admitted prior art, (circuit of Figure 1), without achieving an improvement in circuit operation, as filters 141 and 142 of Applicants' admitted prior art are taught to provide the desired level of noise filtering and image signal removal.

The Examiner claims motivation is provided by wanting to remove unwanted image signals. However, as stated above, any unwanted image signals are already removed in the circuit of Figure 1 by the high precision filters 141 and 142. Therefore, adequate motivation for combining *Marshall* with the Applicants' admitted prior art has not been made of record. Thus, claims 1-4 and 8-33 which recite the aspects relied upon in *Marshall* are patentable over the 35 U.S.C. §103(a) rejection of record.

2. No Suggestion or Motivation to Combine Applicants' Admitted Prior Art, *Marshall*, and *Tomasz*

The Examiner admits that the Applicants' admitted prior art in view of *Marshall* does not disclose both mixers disposed on a common integrated circuit substrate. (See Final

Office Action at 4). However, the Examiner relies on *Tomasz* as teaching this element. (See Final Office Action at 4). Yet, proper motivation must be present in order to combine the cited references under 35 U.S.C. §103. The Examiner merely states that placing mixers on an integrated circuit is well known in the art, and thus, it would be obvious to one of ordinary skill in the art to have mixers placed on an integrated circuit to save space and cost. As pointed out in response filed July 1, 2003, the Examiner is relying on the Applicants' specification for the motivation to combine Applicants' admitted prior art in view of *Marshall* with *Tomasz*. (Specification, page 4, lns 2-4). Therefore, claims 4, 8-10, 16, 20-25, and 30-33 which recite the aspects relied upon in *Tomasz* are patentable over the 35 U.S.C. §103(a) rejection of record.

Further, Applicant has shown in the Amendment filed July 1, 2003 that Applicants' admitted prior art teaches away from the combination suggested by the Examiner. Accordingly, the rejection of record does not establish a prima facie case of obviousness.

B. Applied References Fail to Teach All Claim Limitations

Applicants respectfully assert that even if the suggested combinations were made, the resulting combination of Applicants' admitted prior art in view of *Marshall* and further in view of *Tomasz* would not teach each and every element of the following claims.

1. Independent Claims

Claims 15 and 30

Claim 15 recites, in part:

a first single sideband mixer circuit having a first input and a first output...

a second single sideband mixer circuit having a second input and a second output...

Claim 30 recites, in part:

providing a first single sideband mixer...

providing a second single sideband mixer...

Applicants admitted prior art in view of *Marshall* and further in view of *Tomasz* fails to teach these elements of claims 15 and 30. Applicants' admitted prior art teaches mixer 121 used to convert an input signal frequency to a high intermediate frequency utilizing a local

oscillator 131, (Specification, page 8, lns 14-15), and mixer 122 used to convert the high intermediate frequency signal to a desired output frequency signal utilizing local oscillator 132. (Specification, page 9, lns 1-3). However, mixers 121 and 122 are not taught as a first single sideband mixer and a second single sideband mixer.

Marshall teaches a tunable filter 14 that includes a first signal path 32 including first mixer 40 and second mixer 44, and a second signal path 34 that includes third mixer 46 and fourth mixer 50. (*Marshall*, Col. 3, lns 21-36; Fig. 2). These mixers 40, 44, 46, and 50 comprise one tunable filter 14 which is argued by the Examiner to be similar to one single sideband mixer. Yet, *Marshall* only teaches the existence of one tunable filter 14. One tunable filter does not teach the existence of a first and second single sideband mixer as recited in independent claims 15 and 30, and the rejection of record does not address why one of ordinary skill in the art would have been led to modify both mixers in Applicants' admitted prior art.

In addition, *Marshall* teaches an output 24 taken from the first signal path 32 after one mixing operation and further teaches that by taking the i.f. signal after one mixing operation, a second mixing operation is avoided. (*Marshall*, col. 3, lns 10-13). Accordingly, the circuit configuration of *Marshall* does not appear to provide a single sideband output and thus is not a single sideband mixer. Furthermore, *Tomasz* discloses first mixer 208 (*Tomasz*, col. 3, lns 27-32), and second mixers 214 (col. 3, lns 41-45), but mixer 208 and mixers 214 are not single sideband mixers. Hence, *Tomasz* fails to cure the deficiencies of *Marshall*. Thus, the cited art fails to teach all the elements recited in claims 15 and 30. Therefore, the rejection under 35 U.S.C. § 103(a) for claims 15 and 30 should be withdrawn.

2. Dependent Claims

Claims 2-4, 8-14, 16-29, and 31-33 depend directly or indirectly from their respective base claims 1, 15, and 30, and thereby, they inherit all of the respective limitations. Accordingly, it is respectfully submitted that the dependent claims are allowable based on their dependency from independent base claims 1, 15, and 30 for at least the reasons discussed above. Thus, Applicants respectfully submit that based on the arguments above, claims 2-4, 8-14, 16-29, and 31-33 are patentable over the 35 U.S.C. §103(a) rejection of record.

Applicants respectfully request the Examiner to reconsider all the elements of the dependent claims pointed out below in determining the existence of patentable subject matter. Specifically, the Examiner agreed in the interview conducted on December 15, 2003 to pay close attention to the elements present in the dependent claims.

Claims 2-10

Claims 2-10 recite, in part:

a first single sideband mixer...wherein said first single sideband mixer is disposed between said input signal interface and said second single sideband mixer...
a second single sideband mixer...

Applicants admitted prior art in view of *Marshall* and further in view of *Tomasz* fails to teach these elements of claims 2-10. Similar to the arguments presented above for independent claims 15 and 30, *Marshall* teaches the existence of one tunable filter 14, and assuming, arguendo, that tunable filter 14 were a single sideband mixer, *Marshall* does not teach the existence of two single sideband mixers. *Tomasz* does not cure this deficiency. Thus, Applicants' admitted prior art in view of *Marshall* and further in view of *Tomasz* fails to teach a first single sideband mixer and a second single sideband mixer as recited in claims 2-10. Therefore, the Applicants respectfully request that the 35 U.S.C. §103(a) rejection for claims 2-4 and 8-10 be withdrawn.

Claims 11, 13, and 14

Claims 11, 13, and 14 recite, in part:

a filter...providing attenuation of image signals substantially equal to a difference between system requirements and image rejection achieved by said first single sideband mixer.

Applicants' admitted prior art in view of *Marshall* and further in view of *Tomasz* fails to teach this element of claims 11, 13, and 14. The Examiner asserts that filter 210 of *Tomasz* discloses this element of claims 11, 13, and 14. (See Final Office Action at 4). Yet, the Examiner fails to address the "providing of attenuation of image signals..." in rejecting claims 11, 13, and 14. Furthermore, *Tomasz* merely teaches a filter 210 that is coupled to a first mixer 208 for filtering an intermediate frequency signal, (*Tomasz*, Col. 3, lns 28-33; Fig. 2), but *Tomasz* does not teach providing the attenuation of image signals equal to a difference

between system requirements and image rejection achieved by a first single sideband mixer as recited in claims 11, 13, and 14. Therefore, the Applicants respectfully request that the 35 U.S.C. §103(a) rejection for claims 11, 13, and 14 be withdrawn.

Claim 12

Claim 12 recites, in part:

a filter ...providing attenuation of carrier leakage signals substantially equal to the difference between system requirements and carrier leakage rejection achieved by said first single sideband mixer.

Applicants' admitted prior art in view of *Marshall* and further in view of *Tomasz* fails to teach this element of claim 12. The Examiner asserts that filter 210 of *Tomasz* discloses this element of claim 12. (See Final Office Action at 4). Yet, the Examiner fails to address the "providing of attenuation of carrier leakage signals..." in rejecting claim 12. Furthermore, *Tomasz* simply teaches a filter 210 that is coupled to a first mixer 208 for filtering an intermediate frequency signal, (*Tomasz*, Col. 3, lns 28-33; Fig. 2), but *Tomasz* does not teach providing the attenuation of carrier leakage signals equal to a difference between system requirements and carrier leakage rejection achieved by a first single sideband mixer as recited in claim 12. As such, the references cited fail to teach all the claim limitations of claim 12. Hence, the Applicants respectfully request that the 35 U.S.C. §103(a) rejection for claim 12 be withdrawn.

Claims 17 & 18

Claims 17 and 18 recite, in part:

a phase shifter at said first input to split a signal provided thereto...

Applicants' admitted prior art in view of *Marshall* and further in view of *Tomasz* fails to teach this element of claims 17 and 18. The Examiner asserts that phase shifter 54 of *Marshall* provides an in-phase and quadrature signals, and thus, it discloses the phase shifter as claimed in claims 17 and 18. (See Final Office Action at 5). However, the phase shifter 54 is connected to the output of local oscillator 52, and the output of phase shifter 54 is connected to the second inputs of mixers 40 and 44. (*Marshall*, Col. 3, lns 42-48). Thus, phase shifter 54 is not located at the first input to split a signal provided thereto, as recited in claims 17 and 18. As such, the references cited fail to teach all the claim limitations of

claims 17 and 18. Hence, the Applicants respectfully request that the 35 U.S.C. §103(a) rejection for claims 17 and 18 be withdrawn.

Claim 22

Claim 22 recites:

amplifier provides linear operation substantially only at said increased frequency.

Applicants' admitted prior art in view of *Marshall* and further in view of *Tomasz* fails to teach this element of claim 22. The Examiner asserts that Applicants' admitted prior art amplifier 111 and amplifier 224 of *Tomasz* disclose an amplifier coupled between first and second mixers. (See Final Office Action at 5). However, neither amplifier cited by the Examiner teaches an amplifier that provides linear operation substantially only at said increased frequency. As such, the references cited fail to teach all the claim limitations of claim 22. Hence, the Applicants respectfully request that the 35 U.S.C. §103(a) rejection of claim 22 be withdrawn.

Claims 24 & 25

Claims 24 and 25 recite, in part:

a filter coupled in a signal path between said first single sideband mixer circuit and said second single sideband mixer circuit, wherein said filter provides attenuation approximately equal to a difference between system requirements and an amount of image rejection provided by said first single sideband mixer.

Applicants' admitted prior art in view of *Marshall* and further in view of *Tomasz* fails to teach this element of claims 24 and 25. The Examiner asserts that Applicants' admitted prior art in view of *Marshall* and further in view of filter 210 of *Tomasz* discloses a filter coupled to a first single sideband mixer. (See Final Office Action at 4). However, the Examiner fails to address the element of claims 24 and 25 relating to providing attenuation approximately equal to a difference between system requirements and an amount of image rejection provided by said first single sideband mixer. In addition, filter 210 of *Tomasz* is coupled to a first mixer 208 for filtering an intermediate frequency signal, (*Tomasz*, Col. 3, lns 28-33; Fig. 2), but this filter is not coupled in a signal path between a first single sideband mixer and a second single sideband mixer that provides attenuation equal to the difference between system requirements and an amount of image rejection provided by the first single sideband mixer. Furthermore, *Marshall* teaches the existence of a polyphase filter 58 that is

disposed between mixers 40 and 46 and mixers 44 and 50, but this filter is part of the N-path filter 14. (*Marshall*, Col. 5, lns 5-10; Fig. 8). Thus, filter 58 is not coupled in a signal path between a first single sideband mixer and a second single sideband mixer circuit. As such, the references cited fail to teach all the claim limitations of claims 24 and 25. Hence, the Applicants respectfully request that the 35 U.S.C. §103(a) rejection for claims 24 and 25 be withdrawn.

Claim 27

Claim 27 further recites:

said increased frequency is a frequency above a desired range of video signal frequency division channels and wherein said decreased frequency is a particular video signal frequency division channel of said range of video signal frequency division channels.

Applicants' admitted prior art in view of *Marshall* and further in view of *Tomasz* fails to teach this element of claim 27. The Examiner asserts that the Applicants' admitted prior art teaches this element of claim 27. (See Final Office Action at 3). Yet the Examiner merely asserts that the Applicants' admitted prior art teaches a first mixer circuit having a first input and a first output, where the signal provided to the first input is provided to the first output at an increased frequency (See Final Office Action at 3), but the Examiner fails to establish that the prior art discloses an increased frequency that is a frequency above a desired range of video signal frequency division channels as recited in claim 27. Therefore, the Applicants respectfully request that the 35 U.S.C. §103(a) rejection for claim 27 be withdrawn.

Claims 31-33

Applicants would like to point out that the Examiner has failed to specifically address claims 31-33 in making his rejection. As argued in the amendment filed July 1, 2003, the Examiner has failed to specifically articulate any rejection early in the prosecution process so that the Applicants have an opportunity to provide evidence of patentability and otherwise respond completely at the earliest opportunity. Thus, Applicants respectfully request that the Examiner specifically set forth the grounds for rejection with respect to claims 31-33, so that the Applicants may have a full and fair opportunity to explore the patentability of these claims.

Claim 31 recites:

disposing a filter between said first single sideband mixer and said second single sideband mixer, wherein said filter is adapted to substantially rely upon said first single sideband mixer for image rejection.

Applicants' admitted prior art in view of *Marshall* and further in view of *Tomasz* fails to teach this element of claim 31. *Marshall* teaches the existence of low pass filter 42 between mixers 40 and 44, a low pass filter 48 between mixers 46 and 50, (*Marshall*, Col. 3, lns 22-36; Fig. 2), and a polyphase filter 58 between mixers 32 and 46 and mixers 44 and 50. (*Marshall*, Col. 5, lns 5-10; Fig. 8). However, these filters are part of the N-path filter 14 which is argued to be similar to the single sideband mixer. As such, *Marshall* teaches the existence of filters inside of the N-path filter 14, and therefore, does not teach disposing a filter between a first single sideband mixer and a second sideband mixer which is adapted to rely upon the first single sideband mixer for image rejection. Furthermore, *Tomasz* fails to cure this deficiency. Thus, the cited references fail to teach all the elements of claim 31, and therefore, the Applicants respectfully request that the 35 U.S.C. §103(a) rejection for claim 31 be withdrawn.

Claims 32 and 33 recite:

at least one filter having frequency selection characteristics insufficient to independently provide head end quality signal characteristics.

Claim 33 further recites:

at least one amplifier having linearity characteristics insufficient to provide head end quality signal characteristics when tones associated with an undesired image signal are present with tones of a signal to be amplified.

Applicants respectfully assert the Applicants' admitted prior art in view of *Marshall* and further in view of *Tomasz* fails to teach these elements of claims 32 and 33 as listed above. *Marshall* and *Tomasz* teach the use of filters, but neither *Marshall* nor *Tomasz* teaches the use of a filter having frequency selection characteristics insufficient to independently provide head end quality signal characteristics. In addition, neither reference teaches an amplifier having linearity characteristics insufficient to provide head end quality signal characteristics when tones associated with an undesired image signal are present with tones of a signal to be amplified as recited in claim 33. As such, the references cited fail to

teach all the claim limitations of claims 32 and 33. Thus, the Applicants respectfully request that the 35 U.S.C. §103(a) rejection for claims 32 and 33 be withdrawn.

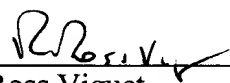
IV. Summary

In view of the above, each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to pass this application to issue.

Applicant believes no fee is due with this response. However, if a fee is due, please charge our Deposit Account No. 06-2380, under Order No. 49581/P024US/10006096 from which the undersigned is authorized to draw.

Dated: December 23, 2003

Respectfully submitted,

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